APPLICANTS' REMARKS AND ARGUMENTS

The Amendment:

Claim 1 has been amended to recite that the coating composition is applied as a liquid carrier containing the anti-microbial composition. Support for this limitation is on page 6, lines 17-20 and support for the 15-65% concentration range of the anti-microbial composition in the liquid carrier appears on page 7, lines 10-12.

New claims 19-20 recite preferred liquids- hydrocarbon solvents supported on page 6, lines 21-22, and water with a surfactant supported on page 6, lines 22-31.

New claims 21-22 recite preferred concentrations of the antimicrobial composition in the liquid carrier and support for these claims is at page 7, lines 14-16.

This amendment is submitted in response to the newly cited references, particularly Cummings et al (6,432,416) applied by the examiner in the final rejection. The amendment was not submitted earlier as none of the prior art raised an issue regarding applicants' use of a liquid carrier in the application of the anti-microbial composition.

The Rejection

Claims 1-7, 15 AND 17 were rejected under 35 U.S.C. §103 as unpatentable under 35 USC §103 as considered to be obvious to one skilled in the art from the teachings of Cummings et al in view of Oikawa et al and Zwart.

Claims 8-14, 16 and 18 were rejected under 35 U.S.C. §103 as unpatentable under 35 USC §103 as considered to be obvious to one skilled in the art from the teachings of Cummings et al in view of and Zwart.

Applicants' Arguments:

Briefly, the final rejection is considered improper as the differences between the cited prior and the claimed invention would not have been obvious to one of ordinary skill in the art.

Claims 1-7, 15, 17 and 19-22:

As to claims 1-7, 15 and 17 as previously submitted, no prior art suggests that a polyethylene object having a surface coated with an antimicrobial, polyethylene-fusible coating can be heated sufficiently to fuse the coating into the object and impart antimicrobial activity to the coating. The prior art is also devoid of any teaching that polyethylene of low melt index and that a hydrocarbon resin of high viscosity be used in the coating composition to insure release of the anti-microbial agent from the fused coating.

As pointed out in applicants' following arguments, this rejection is even less relevant when considering the amendment presented herein as the only prior art which suggests heating a coating is Cummings et al which discloses electostatically coating a dry powder onto a substrate and the heating of the coating is an essential element of the electrostatic coating process, a coating method which is now excluded from these claims..

Claims 8-14, 16 and 18

As to claims 8-14, 16 and 18, no prior art suggests that an antimicrobial coating can be applied to the interior wall of a mold and transferred, during molding of a polyethylene object, from the interior wall of the mold into the wall of the polyethylene object, to impart antimicrobial activity to the exterior surface the polyethylene object.

The Cummings et al patent:

Cummings et al disclose electrostatically coating a substrate with powders which contain an antimicrobial agent and curing the powder coating by thermal, photochemical or other radiation treatments. Cummings et al go to great lengths to describe how a dry mixture of solid particles suitable for electrostatic coating can be prepared, e.g., see column 3, line 30 to column 4, line 44. Cummings et al heat the powder coating to cure the dry powders into a film on the surface of the substrate, although electron beams or ultraviolet, infrared and the like could also be used for this purpose; column 3, lines 26-28.

The Cummings et al patent is the only cited reference which discloses heating of a anti-microbial coating on a substrate. Since the heating step is used by Cummings et al as a consequence of their selection of a dry powder coating, applicants' claims clearly distinguish from the applied prior art as applicants apply a liquid coating to a polyethylene substrate and no prior art suggests heating such a coating to fuse it into a substrate. Even without this amendment, applicants submit that the claims distinguish over the prior art for the following additional reasons.

While Cummings et al specifically disclose coating metal objects, there is a suggestion that the treatment can be applied to nonmetallic objects. The examiner has argued that the disclosure of treating nonmetallic substrates by Cummings et al renders this reference combinable with Oikawa et al to suggest that the treatment can obviously be applied to polyethylene, and even that Cummings et al suggest that their antimicrobial coating is fused into the wall of the product (page 5, line 15 of the Office action).

Applicants contest this argument; "nonmetal substrate" can include, wood, stone, concrete, plaster or any of the hundreds of plastics. This is not a suggestion of polyethylene, nor does this disclosure render the teachings of Cummings et al obviously combinable with those of Oikawa et al. There is also no suggestion by

Cummings et al that their coating is fused into the surface of the substrate. On the contrary, Cummings et al apply their coating to metal surfaces (steel and aluminum) with melting temperatures far in excess of any temperature taught by Cummings et al and fusion into metal surfaces could never occur when curing a dry resin coating.

The Oikawa et al patent:

This patent discloses a complex laminate of an antimicrobial film and a steam impervious film which are bonded to a steam pervious substrate film. In the simplest application described in Example 1, a layer of an anti-microbial compound (allylisothiocyanate inclusion cyclodextrin) film is adhesively bonded between a steam impervious film (polyvinylidene chloride on polyethylene terephthalate) and a low density polyethylene film. The adhesive is two component polyurethane; column 15, lines 23-25, although any of the well known adhesive agents for joining resins could be used; column 15, lines 17-20. There is no suggestion of bonding films or coatings without an adhesive by heating or fusing.

One skilled in the art and attempting to combine the teachings of Cummings et al and Oikawa et al has the choice to use an adhesive without heating to bond laminated films, such as suggested by Oikawa, or heating of a dry powder coating as suggested by Cummings et al. Applicants do neither. Applicants do not prepare a laminate of separate films. Applicants do not apply a coating of dry powders. Since the only disclosure of heating a coating appears in the Cummings et al patent and is needed in that patented method to fuse dry electrostatically deposited powders, there is no suggestion in the prior art to heat a coating from a liquid on a polyethylene substrate to fuse that coating into the substrate. In other words, it would not be obvious to one of ordinary skill in the art to cherry pick the heating step used by Cummings et al for dry powders and

substitute that step for the adhesive used by Oikawa.

The Zwart patent:

Zwart discloses rotational molding in which a coloring additive and an anti-microbial agent can be included in the molding resin. This is exactly the approach that applicants seek to avoid, because the Zwart method results in dispersion of the expensive anti-microbial agent throughout the entire substrate (molded part) with unavoidable degradation of the resin properties. Applicants apply the anti-microbial agent as a coating which is fused into the external wall of a polyethylene part. The examiner has cited this patent for a disclosure of polyethylene of a low melt index. Zwart, however, specifies a low melt index of polyethylene to enhance drying of the admixed colorant and polyethylene powder; see column 6, lines 1-5 where it is stated:

> To enhance the drying of the freshly colorant-coated powder, the grinding mill should be operated at the highest possible temperature. The operating temperature will be restricted by the melt behavior of the particular polymeric resin material used.

Applicants do not grind dry powder mixtures in the preparation of a mixture of polyethylene resin and anti-microbial agent. Instead these components are mixed together by adding them to a liquid carrier; see page 6, lines 17-21 of the specification. The teaching by Zwart to select a low melt polyethylene to enhance the grinding of a dry powder mixture does not suggest to one of ordinary skill in the art that a low melt index polyethylene should be selected when preparing the mixture in a liquid carrier. Applicants specify polyethylene with a low melt index to avoid retarding the release of the anti-microbial agent from the coating which has been fused into the surface of the polyethylene object. This purpose is without any suggestion in the prior art.

a rotational mold which contains an anti-microbial agent and which transfers entirely into the external wall of a part molded in that mold to produce a molded polyethylene with a permanent anti-microbial property. Zwart is particularly significant in this consideration as Zwart discloses the prior art approach which applicants avoid; see page 1, line 31 to page 2, line 4 where the following is stated:

> Loading the molding resin with an amount of anti-microbial salt sufficient to impart anti-microbial activity is of limited efficacy, often degrades the physical properties of the resin and is too costly.

Zwart does not disclose a method to form a molded part having a coating which contains an anti-microbial agent that is fused only into the exterior surface of the part which is formed of resin which is not adulterated with the agent.

Summary:

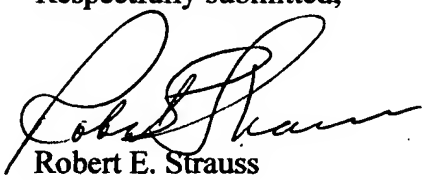
The prior art fails to suggest to one of ordinary skill in the art that a coating containing an anti-microbial agent can be fused into the exterior surface of a polyethylene object to impart permanent anti-microbial activity to the surface. Applicants have achieved this result by forming a liquid mixture of a selected resin (polyethylene of a low melt index or a hydrocarbon resin of high viscosity) and an anti-microbial agent which can be applied to the surface of a preformed polyethylene part or the surface of a rotational mold, and heat fused into the external surface of the preformed polyethylene object or the polyethylene object which is formed in the rotational mold. This achievement is without any suggestion.

The claims are believed to be of proper form and scope and for the reasons set forth herein define patentable invention over the prior art. Reconsideration and allowance are solicited.

In the event that the examiner continues the final rejection, it is requested

In the event that the examiner continues the final rejection, it is requested that the amendment be entered for purposes of appeal. As pointed out, the amendment presented in this response is necessitated by the application of prior art which was newly cited in the final rejection and for this reason, was not earlier presented. It is believed that entry for purposes of appeal is proper.

Respectfully submitted,



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